Amendments To The Specification

Please replace the paragraph at page 4, lines 4 and 5 with the following amended paragraph:

FIGURE 5 illustrates an operational flow for non-interactive playback ~~testing for~~ testing of a computer sound card.

Please replace the paragraph at page 4, lines 6 and 7 with the following amended paragraph:

FIGURE 6 illustrates an operational flow for [[a]] non-interactive audio ~~test for~~ testing of the record gain associated with a computer sound card.

Please replace the paragraph at page 5, lines 15 through 28 with the following amended paragraph:

Referring now to FIGURE 1A, an illustrative computer architecture for a computer 4 for practicing the various embodiments of the invention will be described. The computer architecture shown in FIGURE 1A illustrates a conventional server or personal computer, including a central processing unit 16 ("CPU"), a system memory 24, including a random access memory 26 ("RAM") and a read-only memory ("ROM") 28, and a system bus 22 that couples the memory to the CPU 16. A basic input/output system 30 containing the basic routines that help to transfer information between elements within the computer, such as during startup, is stored in the ROM [[30]] 28. The computer 4 further includes a mass storage device 34 for storing an operating system 32 suitable for controlling the operation of a networked computer, such as the WINDOWS NT or XP operating systems from MICROSOFT CORPORATION of Redmond, Washington. The mass storage device 34 also stores application programs, such as the computer program 8, the automated testing program 10, the Web browser 6 and plug-in 7, and data, such as the test scripts 11 used by the automated testing program 10.

Please replace the paragraph at page 7, lines 10 through 22 with the following amended paragraph:

As discussed briefly above, the redirection device 12 also includes input/output ports for connecting peripheral input devices that would otherwise be connected to the computer 4. In particular, a mouse and keyboard (not shown in FIGURE 1A) may be directly connected to the redirection device 12. Input commands received by these devices may then be passed by the redirection device 12 to the input/output controller 20. Additionally, user input commands may also be received by the plug-in 7 at a remote computer. These commands may be generated by a user or by an automated testing program 10 and are transmitted by the plug-in 7 to the redirection device 12. The remotely generated commands are also passed from the redirection device 12 to the input/output controller 20 for execution on the computer 4 as if the commands were generated locally. In this manner, the operation of the computer 4 and, in particular, the operation of the computer program 8, may be completely controlled from a remote computer.

Please replace the paragraph at page 12, line 22 through page 13, line 7 with the following amended paragraph:

The wave table synthesizer 415 produces output sounds of the samples contained in the ROM 405 and the RAM 410. The coder/decoder (CODEC) 425 is a hardware component that can convert audio or video signals between analog and digital forms similar to the components 325 and 330 described above with reference to FIGURE 2. The CODEC 425 may also be used to compress and decompress audio and video data, as required. According to embodiments of the present invention the CODEC 425 is responsible for the audio to digital and digital to audio conversion of audio signals. The frequency modulation (FM) synthesizer 420 is responsible for playing FM sounds. The mixer 430 includes an analog mixer integrated circuit for mixing together sounds from various inputs such as a microphone, an auxiliary input, a wave table synthesizer 415 and FM synthesizer 420 and a CD-ROM audio input to a final mix which is then sent to line level and speaker outputs 435 and 440. According to an embodiment of the present invention tested sounds (tones) are looped back through a ~~record in~~ record-in after receipt by the

mixer 430. A variety of input output lines including a line out 435, a speaker out 440, an auxiliary in 445, a microphone in 450, and a joystick/MIDI 455.

Please replace the paragraph at page 17, line 23 through page 18, line 8 with the following amended paragraph:

At step 515, a single tone at a set frequency and intensity is generated from the frequency synthesizer 210, wave table 415, or FM synthesizer 420 and is passed through the CODEC 425 for conversion from digital to analog. After the tone is passed through the mixer 430, the tone is looped back using the internal loop back mechanism 230 through a selected record line such as a microphone input line to the digital signal processor 235. At the digital signal processor, the digital tone is passed through the CODEC 425 and is converted from analog back to digital. At step [[525]] 520, the tone is recorded and is then converted from a time domain to a frequency domain using a fast fourier transform (FFT) analysis. At step 525, the [[The]] results of the FFT analysis are compared to a known frequency and intensity of the pre-produced and played tone to compare the recorded tone against the played tone. At step 530 a determination is made as to whether the recorded tone matches the played tone. For example, if the FFT analysis plots a single spike at 1000 Hertz and the played tone was a 1000 Hertz tone, then the test passes. If not, the method proceeds to step [[530]] 535 and test fails, and the method ends at step 590. As should be understood, if no tone at all is recorded through the selected record line, then the line is designated as inoperable.

Please replace the paragraph at page 18, line 17 through page 19, line 3 with the following amended paragraph:

As briefly described above, if the sound card being tested in accordance with the steps described for FIGURE 5 fails any of the described tests, the manufacturer or tester may isolate the sound card by inserting a known operable sound card and repeating the tests. If a failure still occurs in any of the foregoing described tests, the manufacturer or tester may then look to other components such as software modules responsible for passing sound data through the sound card as a possible source for an audio malfunction or quality deficiency. For example, if testing a

microphone input line according to the steps described in FIGURE 5, and a failure condition results, the microphone input line will not be marked in the registry of the computer 4 as operable until an acceptable test for the microphone input line is achieved after the sound card has been replaced or repaired. On the other hand, if the microphone input line according to the forgoing example passes the tests described above, a registry key in the computer 4 registry will be set to mark the microphone input line as acceptable for future use. Advantageously, utilizing the methods described above, testing for both an [[and]] input line to the mixer and an output line from the mixer to a recorder may be performed at the same time by passing a pre-produced sound through an input line and out through an output line via the loop back function.

Please replace the paragraph at page 21, lines 13 through 25 with the following amended paragraph:

At step [[635]] 630, the recorded tone is analyzed using an FFT analysis and at step 635 the results of the record gain value are displayed. After the record gain value for a first setting is calculated and displayed, the method returns back to step 615, and the volume level is increased by a desired level, for example by 25%. The same tone is played through the record output line such as a speaker output line at the increased volume level, and the record gain value is calculated, as described above. After the test is performed at all desired volume levels, the volume levels are analyzed to determine whether the record gain varied with the varying recording volume levels, at step 640. If so, the record gain test is determined to have passed. That is, if the record gain test shows that consistent increases in the calculated gain are associated with the corresponding volume increases, the test passes for the output or input line in question. If not, the record gain test is determined to have failed which indicates that a problem with the volume control setting associated with the sound card 300 or 400 may exist.

Please replace the paragraph at page 22, lines 9 through 17 with the following amended paragraph:

Any sounds or tones passing through the muted channel are also recorded. At step [[735]] 730, the recorded tones from the muted channel and the unmuted channel are analyzed using an FFT analysis. The muted channel is functioning properly if no sounds or tones are passing through the muted channel. It is expected that a flat FFT signal without a peak or spike associated with the frequency and intensity of the played tone will be presented. If an FFT signal is presented with a peak or spike at a position that would be expected in the unmuted channel is found for the muted channel, the indication is that the sound or tone passed through the unmuted channel has crossed over through the muted channel.

Please replace the paragraph at page 22, lines 18 through 27 with the following amended paragraph:

At step 735 the calculated DC Offset, SNR, THD and THD+N values are calculated and analyzed as described above. At step 740 the unmuted channel may be tested for general operability, as described with reference to FIGURE 5. At step 745, the test is repeated using the reverse orientation where the first muted channel is unmuted and the first open channel is muted. At step 750, the test is repeated with no mute applied to either channel so that the operability of both channels is tested simultaneously. As should be understood, testing both lines simultaneously without applying muting to either line may also be used to test the record gain in the two [[line]] lines to make sure that neither line is louder than the other line when volume settings are set to the same setting for each line. The method ends at step 790.

Please replace the paragraph at page 22, line 28 through page 23, line 7 with the following amended paragraph:

FIGURE 8 illustrates an operational flow for non-interactive audio testing of an audio mixer line. Testing a mixer component 430 as described with reference to FIGURE 8 provides useful information as to the results of mixing a combination of tones or sounds. The method 800 begins with start step 805 and proceeds to step 810 where the internal loop back function is set to

ON for the mixer integrated circuit 430 described with reference to FIGURE 4. At step 815, an API calls the playback of a tone through one record output channel and simultaneously a MIDI sound file is called through other channels. The single tone of a known frequency intensity and the MIDI file having known sound characteristics are mixed through the mixer 430 and the output is recorded[[.]] , at step 820.

Please replace the paragraph at page 23, lines 8 through 21 with the following amended paragraph:

At step 825 and FFT analysis is performed on the output of all channels through which tones or sounds are recorded in accordance with the test. At step 830, a determination is made as to whether an FFT peak or spike in the recorded tone is associated with the known single tone and whether FFT peaks or spikes in the recorded tones or sounds are associated with frequencies and intensities for the MIDI file. At step 835, the results are displayed. At step 840, a determination is made as to whether the known single tone and the known MIDI file tones were recorded after having passed through the mixer line. If not, an indication is presented that one of either the single tone or the MIDI file tones was not mixed properly by the mixer 430, and the method proceeds to step 845 and a failure condition is presented. If both the single tone and the MIDI file tones are detected after passing through the mixer 430, the mixer 430 is determined to have passed the test, at step 850. The method ends at step 890. Exemplary APIs used for causing a tone or sound to be passed through, processed by and passed out of the mixer 430 include:

Please replace the paragraph at page 24, lines 1 through 16 with the following amended paragraph:

FIGURE 9 illustrates an operational flow for a non-interactive audio testing through a record output line over varying frequency ranges. The method 900 starts at step 905 and proceeds to step 910 where the internal loop back function is set to ON. A pre-produced sound or tone is analyzed at a first known frequency at steps 915 – 925 in the same manner as described in reference to FIGURE 5. In the first instance, a determination is made as to whether the played

toned is passed through the output line and recorded properly as described with reference to FIGURE 5. After the recorded tone is analyzed at step 925, a determination is made as to whether the frequency played through the record output line matches the frequency of the recorded tone at step 930. If so, the test for that specific frequency passes. At step 935, the test is repeated at varying frequencies of tones passed through the record output line. If it is determined that the recorded tones at each of the prescribed frequencies are recorded through the output line at matching frequencies, the frequency range test is determined to have passed. On the other hand, if the frequencies of recorded tones do not match the frequencies of the corresponding played tones, the frequency range test is determined to have failed.

Please replace the paragraph at page 24, line 26 through page 25, line 12 with the following amended paragraph:

Referring to FIGURE 10, the method 1000 begins at start step 1005 and proceeds to step 1010 where the internal loop back function is set to ON. At step 1015, the WaveOut device, such as the frequency synthesizer 210, passes a known noise sound through a record output line through which sounds or tones will be received from a connected CD unit. At step 1020, the noise gain associated with the passed noise is calculated. At step [[1020]] 1025, the CD unit recording is set to ON, and at step 1030, an audio CD in the CD unit drive is played using Advanced SCSI Programming Interface (ASPI) commands. At step 1035, the tone is played and is looped back through the record output line associated with the connector between the CD unit and the sound card. The tones or sounds are recorded, as described with reference to FIGURE 5, and the gain associated with the played CD sounds or tones is calculated. Step 1040, the gain associated with the played CD (Compact Disc) sound or tone is compared to the gain associated with the noise. If the gain associated with the played sounds or tones is greater than the noise gain, the method proceeds to step 1050 and a determination is made ~~between~~ that the output cable between the CD unit and the sound card is connected. If the gain associated the played tones from the CD are not greater than the noise gain, the method proceeds to step 1045 and the test is determined to have failed.